Familiarization Guide

HP Vectra XM 5/xx series 4 PC

This guide is for experienced HP Support Center personnel CEs and reseller technicians. That is, personnel who have already completed the HP Vectra PC family training course, or equivalent, and have at least six months of experience servicing the HP Vectra PCs.

It is a self-paced training guide designed to train you to install, configure, and repair the PC. You can follow it without having any equipment available.

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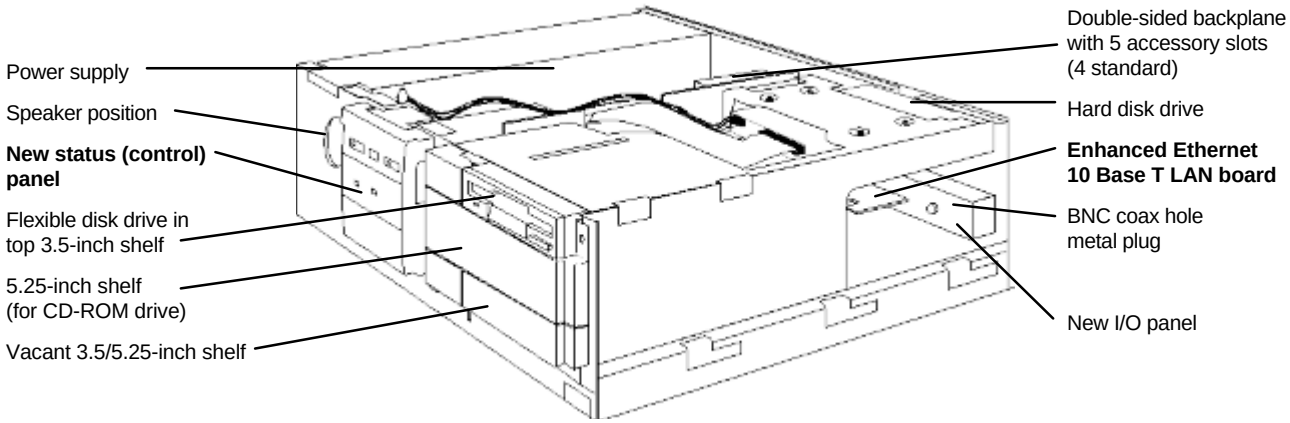
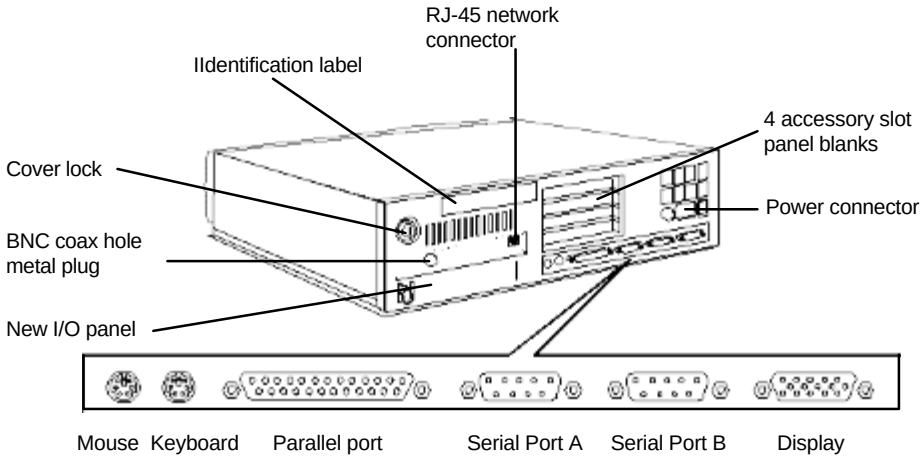
1 PRODUCT OVERVIEW AND FEATURES

This chapter gives an overview of the *HP Vectra XM 5/xx series 4 PC*. It compares it to the *HP Vectra VL 5/xx series 4 desktop PC*, and highlights the new features: the Ethernet 10 BaseT network board on all models; the completely new BIOS, setup and POST; and the new design of the status (control) panel.

PRODUCT OVERVIEW

The following diagrams show the front and rear views of the *HP Vectra XM 5/xx series 4 PC*.


Power supply
Speaker position
New status (control) panel
Flexible disk drive in top 3.5-inch shelf
5.25-inch shelf (for CD-ROM drive)
Vacant 3.5/5.25-inch shelf
Double-sided backplane with 5 accessory slots (4 standard)
Hard disk drive
Enhanced Ethernet 10 Base T LAN board
BNC coax hole metal plug
New I/O panel



NETWORK BOARD AND OTHER NEW FEATURES

The *HP Vectra XM 5/xx series 4 PC* is based on the *HP Vectra VL 5/xx series 4 desktop PC*. The major new features are:

- Enhanced Ethernet 10 BaseT network board, supporting **remote power-on**, fitted as standard in a PCI slot on all models.
- Redesigned BIOS, *Setup* and POST routines, with a new **Error Message Utility**.
- A new design of status (control) panel, **with network activity light**.

MODELS AVAILABLE AT PRODUCT LAUNCH

Platform*	Product Number	Hard Drive C:	Std. RAM	Cache	Multi-Media	Operating System
XM4 5/75	**D3961A**	None	8 MB	No	No	none
	D3962A	840 MB (D2908-60xxx)				Windows for Workgroups 3.11
	D3963A	1.2 GB (D2930A)				
XM4 5/100	**D3964A**	None	8 MB	No	No	none
	D3965A	840 MB (D2908-60xxx)				Windows for Workgroups 3.11
	D3966A	1.2 GB (D2930A)				
XM4 5/120	**D3967A**	None	8 MB	Yes	No	none
	D3968A	840 MB (D2908-60xxx)	16 MB	Yes	No	Windows 95 or Windows for Workgroups 3.11
	D3975A	1.2 GB (D2930A)		Yes	No	
	D3975S			Yes	No	OS/2 3.0
XM4 5/133	**D3970A**	None	8 MB	Yes	No	none
	D3977A	1.2 GB (D2930A)	16 MB	Yes	No	Windows 95 or Windows for Workgroups 3.11
XM4 5/150	**D3972A**	None	8 MB	Yes	No	none
	D3978A	1.2 GB (D2930A)	16 MB	Yes	No	Windows 95 or Windows for Workgroups 3.11
XM4 5/166	**D4220A**	None	8 MB	Yes	No	none
	D4221A	1.2 GB (D2930A)	16 MB	Yes	No	Windows 95 or Windows for Workgroups 3.11

*All models have an Enhanced IDE disk controller and an S3 Trio 64 Ultra VGA integrated on the PCI bus, an Enhanced Ethernet 10BaseT Network board installed on the PCI bus, and a 1.44 MB flexible disk drive connected to a controller that is integrated on the ISA bus.

VECTRA PRODUCTS COMPARISON

The following table compares the new *HP Vectra XM 5/xx series 4 PC* (in the white, central column) with the *HP Vectra VL 5/xx series 4 desktop PC* and the *HP Vectra XM 5/xx series 3 PC* (in the two shaded columns).

Component	**HP Vectra VL 5/xx series 4 *Desktop* PC**	**HP Vectra XM 5/xx series 4 PC**
Microprocessor	5/90: Pentium 90 MHz 5/100: Pentium 100 MHz 5/120: Pentium 120 MHz 5/133: Pentium 133 MHz 5/150: Pentium 150 MHz (due) 5/166: Pentium 166 MHz (due)	5/75: Pentium 75 MHz 5/100: Pentium 100 MHz 5/120: Pentium 120 MHz 5/133: Pentium 133 MHz 5/150: Pentium 150 MHz 5/166: Pentium 166 MHz
Main memory	32-bit EDO (60 ns) modules	
Standard	8 MB (a pair of 4 MB modules) or 16 MB (a pair of 8 MB modules)	
Maximum	128 MB (chipset limitation)	
Upgrades	Must be installed in pairs	
Sockets	Six (3 banks, one pair in each)	
Error protection	Not supported	
Level 1 cache memory	8 KB for instruction-code, 8 KB for data (both caches on the microprocessor)	
Level 2 cache memory	256 KB synchronous pipeline burst cache memory (socketed on system board)	256 KB synchronous pipeline burst cache memory (D3659A) (socketed on system board)
Video controller	Integrated 64-bit Ultra VGA on PCI bus (S3 Trio 76564V+) or Matrox MGA Millennium video card on PCI bus	Integrated 64-bit Ultra VGA on PCI bus (S3 Trio 64 PnP)
Video memory	1 MB (expandable to 2 MB) for S3Trio 76564V+, or 2 MB (expandable to 8 MB) for Matrox models.	1 MB (expandable to 2 MB) for S3Trio 64 PnP.
Video upgrade socket	Two 512K chips (use D3500A) for S3Trio 76564V+, or 2 MB upgrade card (use D3557A) for Matrox models.	Two 512K chips (use D3500A) for S3Trio 64 PnP.
Disk controller	Master Fast IDE controller on PCI local bus (integrated in system board chip-set)	
Hard disks	Fast IDE 540 MB, 12 ms Fast IDE 640 MB, 12 ms Fast IDE 1 GB, 12 ms Fast IDE 1.2 GB, 11 ms	Fast IDE 840 MB, 10 ms Fast IDE 1.2 GB, 11 ms
Mass storage shelves	One front access 3.5-inch shelf, one front access 5.25-inch shelf, one front access 5.25-inch/3.5-inch (1-inch high) shelf, and one internal 3.5-inch shelf	
Network interface	None	Enhanced Ethernet 10 Base T PCI Network board (5063-8790)
Audio capability	On specific multimedia models only	
Integrated ports	1 parallel port (bi-directional, ECP/EPP capable), 2 serial ports (UART 16650), Keyboard connector, Mouse connector	

Standard accessory slots	One 32-bit PCI; one 32-bit PCI / full-length 16-bit ISA Combinationone full-length 16-bit ISA; one third-length 16-bit ISA	
Power supply	100 W (full range 90-264 VAC)	
Security	Power-on password, mechanical cover lock, disk and port disabling	
Passwords	User Password (8 characters) and Administrator Password (standard delay between failures)	User Password (32 characters) and Administrator Password (increasing delay between failures)
Pre-loaded software	Windows for Workgroups 3.11 (with MS-DOS 6.22), with an option for Windows 95 on some models, or OS/2 3.0 on others; Dashboard, HP User Tools, Drivers	
BIOS ROM	HP/Phoenix BIOS, Flash EEPROM	Phoenix BIOS, Flash EEPROM
***Setup* localization**	English only	
***EMU* localization**	English only	Localized

PRODUCT FEATURES

PROCESSOR-LOCAL BUS DEVICES

Intel Pentium Microprocessor

The *HP Vectra XM 5/xx series 4 PC* is the first series to be introduced with the 166 MHz and 150 MHz Pentium processors.Models are also introduced with processor frequencies down to 75 MHz.

The choice of which voltage regulator module (VRM) to install depends on which Pentium processor is fitted. This is summarized under “Replacing the Processor” in Chapter 2, and “Field Replaceable Parts” in Chapter 3.

Cache Memory

The 120 MHz and faster models of the *HP Vectra XM 5/xx series 4 PC* have 256 KB of level-two (L2) cache memory fitted as standard. The 100 MHz model and slower models work without L2 cache, but have sockets to allow 256 KB to be installed as an accessory (order D3659A synchronous, or D4049A asynchronous cache memory modules).

Main Memory

The main memory of the *HP Vectra XM 5/xx series 4 PC* resembles that of the *HP Vectra VL 5/xx series 4 PC*, in the following respects:

- 6 double interline memory module (DIMM) sockets on the system board, organized as 3 banks: A, B and C.
- 60ns, 32-bit wide, extended data out (EDO) DRAM memory modules used. Classical fast page mode (FPM) modules can be installed in pairs, but performance is decreased for all memory accesses.
- 8 MB (using a pair of 4 MB modules) or 16 MB (using a pair of 8 MB modules) of memory is supplied as standard, expandable to 128 MB.
- **Memory modules must be installed in pairs of identical modules.**

- Only 4 MB or 16 MB modules can be installed in bank C. Bank C supports only single density memory modules.

Part Number	Part	Type	Description	Installable in Bank C
D3646B	8 MB kit	32-bit EDO, 60 ns	2 5 4 MB	yes
D3647B	16 MB kit	32-bit EDO, 60 ns	2 5 8 MB	no
D3648B	32 MB kit	32-bit EDO, 60 ns	2 5 16 MB	yes

PCI BUS DEVICES

Video Controller

A 64-bit PCI video controller is integrated on the system board on all models. This has 1 MB of video memory fitted as standard, up-gradable to 2 MB. The following table summarizes the video resolutions that can be supported, provided that suitable drivers are available for the chosen operating system.

Number of Colors	16	256	32 K	64 K Hi-Color	16.7 M True-Color	Maximum Refresh Rates
Bits per Pixel	4	8	15	16	32	
640 x 480	1 MB				2 MB	75 Hz (60 Hz in VGA)
800 x 600	1 MB			1 MB (2 MB for OS/2)	2 MB	75 Hz
1024 x 768	1 MB		2 MB			75 Hz
1280 x 1024	1 MB	2 MB	Not supported			75 Hz

*Your display might not support the maximum refresh rates that are shown here. Refer to the User's Guide supplied with the display for details of the refresh rates which it supports.

LAN Controller Board

Enhanced Ethernet 10 BaseT network board (5063-8790) is installed in a new PCI accessory slot, on the right-hand side of the double-sided backplane. The board occupies the space underneath the internal, hard disk drive rear shelf. It supports the IEEE 802.3 standard (10-BaseT, giving a data transfer rate of 10 Mbits per second).

The new set of drivers not only supports *remote wake-up* (from *standby* or *sleep* mode), but also *remote power-on* (from the power-off state) activated from a remote network console.

The board has an RJ-45 UTP network connector. This emerges through a new I/O panel at the back of the computer, just below the cover lock assembly. The I/O panel has a hole in it, ready to accept a BNC coax adapter accessory. This hole is normally covered by a metal plug when the adapter is not fitted.

IDE Disk Controller

All models have an Master Fast IDE controller which supports up to four IDE devices, for hard disk and CD-ROM drives, but only three connectors are provided.

Supported Drives

The computer has one internal shelf (for a hard disk drive) and three front-access drive shelves (for front-access disk drives and hard disk drives).

Shelf	Drive	Description	Part Number
Top	Flexible disk drive	3.5-inch 1.44 MB	D2035B
Middle	CD-ROM drive Tape drive (QIC-3020)	Quadruple speed IDE 5.25-inch 1.36 GB	D2896B C4330CA
Bottom	Tape drive	3.5-inch 800 MB	C4320B
Rear internal or Bottom	Hard disk drive	3.5-inch 540 MB IDE 3.5-inch 840 MB IDE 3.5-inch 1 GB IDE 3.5-inch 1.2 GB IDE	D2918A D2925A D2919A D2930A*

*When available as a stand-alone accessory.

ISA BUS DEVICES

Ultra I/O Controller

The Ultra I/O chip provides support for the following devices:

- two 9-pin serial ports (RS-232-C, 16550 UART buffered)
- one 25-pin parallel port (ECP/EPP bi-directional Centronics, supporting IEEE 1284)
- flexible drive controller (FDC), supporting up to two drives (either flexible disk or tape, or one of each)
- keyboard and mouse.

A new keyboard (C3758A) is supplied for use with the Windows 95 operating system (though it will also work with other operating systems).

Audio Controller

Some models of the *HP Vectra XM 5/xx series 4 PC* may be fitted with the following D3567B multimedia kit:

- Quadruple-speed (45) IDE CD-ROM drive (D2896B)
- Sound card (5063-7913)
- Headphones (5182-3552)

(Information on multimedia models was not available at the time of printing. The components are liable to variation until the time of introduction).

Flash ROM

The 256 KB flashable EEPROM chip holds the System ROM firmware. This new software is described in Chapter 3.

SOFTWARE

Firmware

The BIOS, Setup program and POST routines for the *HP Vectra XM 5/xx series 4 PC* are completely new. They are described in detail in Chapter 3.

Preloaded Software

Models with hard disk drives are preloaded with one of the operating systems listed in the following table. The first time the PC is turned on, a software initialization program runs to allow the user to set up the preloaded software. For the models with Windows 95, the user has a once-only choice between Windows 95 and Windows 3.11 during the first power-on.

Models with 8 MB main memory	Windows for Workgroups 3.11 + DOS 6.22
Models with 16 MB of main memory	Windows 95 or Windows for Workgroups 3.11 + DOS 6.22
Models with product numbers ending in 'S' (such as D3975S)	OS/2

These operating systems are supplied with the following utilities:

	Windows for Workgroups	**Windows 95**	**OS/2**
HP video drivers	yes	yes	yes
HP user tools (with video configuration utility	yes	yes	Not needed, since this functionality is directly managed within the operating system.
Mouse control center	yes	Not needed, since this functionality is directly managed within the operating system.	
Advanced power management (APM)	yes		
IDE disk drivers (for 32-bit disk and file access)	yes		
ISA Plug and Play configuration utility (ICU)	yes		
Remote desktop management interface (DMI)	yes	Not yet available	Not yet available

On models without a hard disk drive, online utilities and drivers are available in the HP BBS Library and HP's FTP library services, as well as on diskettes.

Supported Operating Systems

- MS-DOS version 6.22 and above
- Microsoft Windows 95
- Microsoft Windows for Workgroups 3.11
- Microsoft Windows NT 3.51
- OS/2 version 2.11 and OS/2 version 3.0 (WARP)

Certified Network Operating Systems

- Novell 3.12/4.10 Workstation/Client

Note, however, that HP Vectra PCs are not supported as network servers.

DOCUMENTATION

The table below summarizes the documentation that is available for the *HP Vectra XM 5/xx series 4 PC*.

Only selected publications are available in paper-based form. Most are available as printable files from the HP regional support servers, or from the *Support Assistant* CD-ROM.

Title	Regional Support Servers	Support Assistant CD-ROM	Paper-based
HP Vectra XM 5/xx series 4 PC User's Guide	yes	yes	D3960A
HP Vectra XM 5/xx series 4 PC Technical Reference Manual: Hardware and BIOS	yes	yes	no
HPVectra PC Service Handbook (9th Edition)	yes	yes	5963-8033
HPVectra Accessory Service Handbook (5th Edition)	yes	yes	5963-8034
Network Administrators Guide	WinHelp format	yes	no

CHECKPOINT: PRODUCT OVERVIEW AND FEATURES

Now that you have read this chapter, check your understanding. Draw a circle around the initial letter of each correct answer below. Any number of the given answers (from none, to all of them) may be correct.

1 What new Intel processors are introduced with this series of PCs?

a Pentium processors of higher frequencies.
b Pentium processors containing more L1 cache memory.
c Pentium processors containing more L2 cache memory.
d Pentium Pro processors (P6).

2 Which of the following could normally be ordered for an *HP Vectra XM 5/120 series 4 PC* which is supplied with 16 MB of main memory?

a One D3647B kit (32-bit EDO, 60 ns).
b Two D3647B kits (32-bit EDO, 60 ns).
c Three D3647B kits (32-bit EDO, 60 ns).

3 What type of network interface is fitted as standard?

a 10/100 VG Selectable PC LAN Adapter on a PCI board.
b 10/100 VG Selectable PC LAN Adapter integrated on the system board.
c Enhanced Ethernet 10 BaseT on a PCI board.
d Enhanced Ethernet 10 BaseT integrated on the system board.

4 Which of the following combinations of full length accessory boards can you install on an *HP Vectra XM 5/100 series 4 PC*?

a One PCI accessory board and three ISA accessory boards.
b Two PCI accessory boards and two ISA accessory boards.
c Two PCI accessory boards and one ISA accessory board.
d Three PCI accessory boards and one ISA accessory board.

5 Which of the following combinations of *extra* drives can you install on a model which has no hard disk (such as a D4221A)?

a One CD-ROM drive, and one 3.5-inch 800 MB tape drive.
b One CD-ROM drive, and one 5.25-inch 1.36 GB tape drive.
c One CD-ROM drive, and one 3.5-inch 1.0 GB hard disk drive.
d One CD-ROM drive, and two 3.5-inch 1.0 GB hard disk drives.

2 PC HARDWARE STRUCTURE

After reading this chapter you will be familiar with the PC's package and hardware assembly. You will know where its principle parts are (for fault finding, or upgrade and configuration, for example), and you will know where and how to install accessories. In particular, the new status (control) panel is described, and information about installing the BNC Coax adapter on to the Ethernet 10 BaseT Network board is given.

PACKAGING

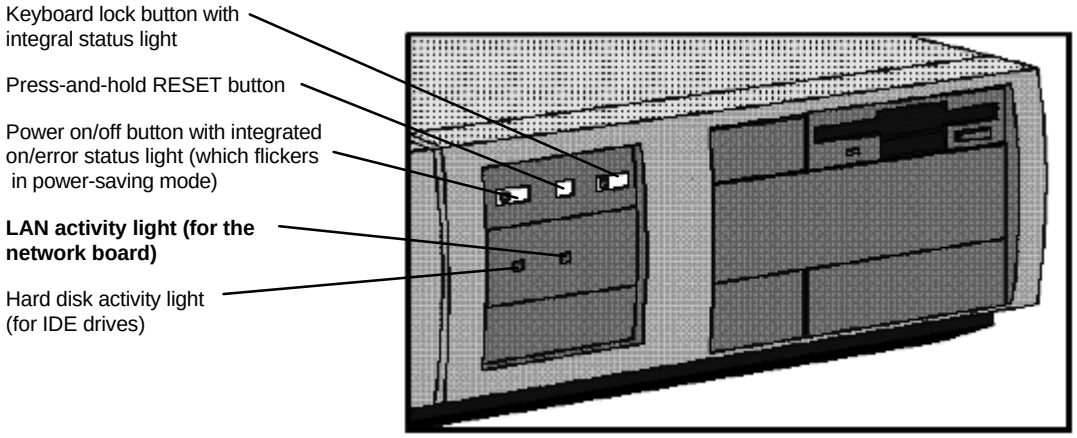
This chapter covers the following servicing and installation topics:

- replacing the system board
- installing and replacing accessories:
  - replacing the processor
  - installing and replacing main memory modules
  - upgrading to 2 MB of video memory
  - installing and replacing mass-storage drives
  - installing the D3979A coax adapter.

The main external features of the desktop package are shown in the diagrams under "Product Overview" in chapter 1. They are:

- connectors for I/O devices on the rear panel
- three front-access shelves for 3.5-inch or 5.25-inch devices
- **new status (control) panel.**

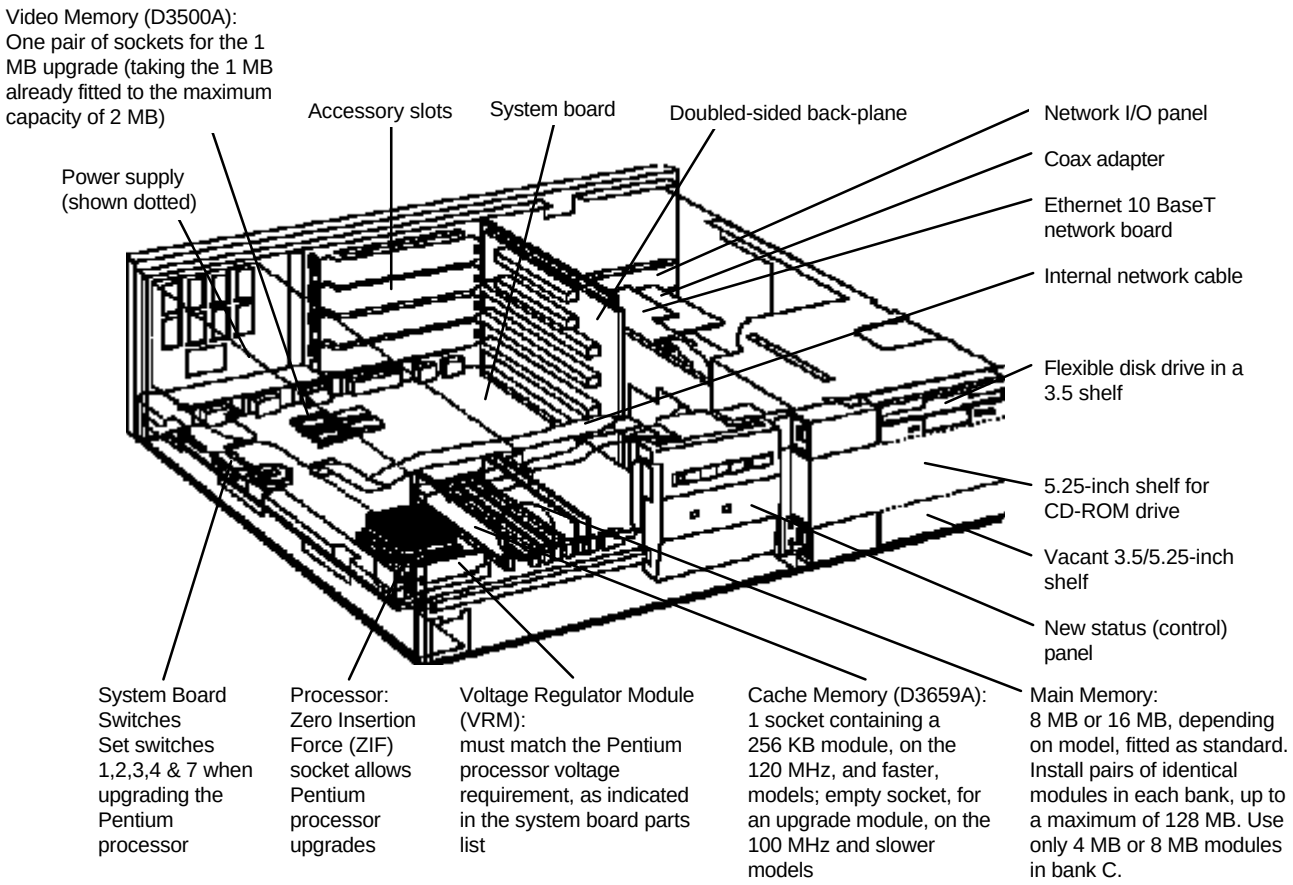
The *HP Vectra XM 5/xx series 4 PC* has a mid-profile desktop package, like that of the *HP Vectra VL 5/xx series 4 desktop PC*, but has a completely new status (control) panel, with the following features:


Keyboard lock button with integral status light
Press-and-hold RESET button
Power on/off button with integrated on/error status light (which flickers in power-saving mode)
LAN activity light (for the network board)
Hard disk activity light (for IDE drives)

Multimedia models also have a volume control button and a socket for headphones.

The main internal features of the desktop package are:

- removable power supply for easy access to system board components
- one internal rear shelf for 3.5-inch devices
- four accessory board slots for accessories (for example, an audio board)
- system board.


Video Memory (D3500A): One pair of sockets for the 1 MB upgrade (taking the 1 MB already fitted to the maximum capacity of 2 MB)
Accessory slots
System board
Doubled-sided back-plane
Network I/O panel
Coax adapter
Power supply (shown dotted)
Ethernet 10 BaseT network board
Internal network cable
Flexible disk drive in a 3.5 shelf
5.25-inch shelf for CD-ROM drive
Vacant 3.5/5.25-inch shelf
New status (control) panel
System Board Switches Set switches 1,2,3,4 & 7 when upgrading the Pentium processor
Processor: Zero Insertion Force (ZIF) socket allows Pentium processor upgrades
Voltage Regulator Module (VRM): must match the Pentium processor voltage requirement, as indicated in the system board parts list
Cache Memory (D3659A): 1 socket containing a 256 KB module, on the 120 MHz, and faster, models; empty socket, for an upgrade module, on the 100 MHz and slower models
Main Memory: 8 MB or 16 MB, depending on model, fitted as standard. Install pairs of identical modules in each bank, up to a maximum of 128 MB. Use only 4 MB or 8 MB modules in bank C.

REPLACING THE SYSTEM BOARD

The system board is shown below. To remove it:

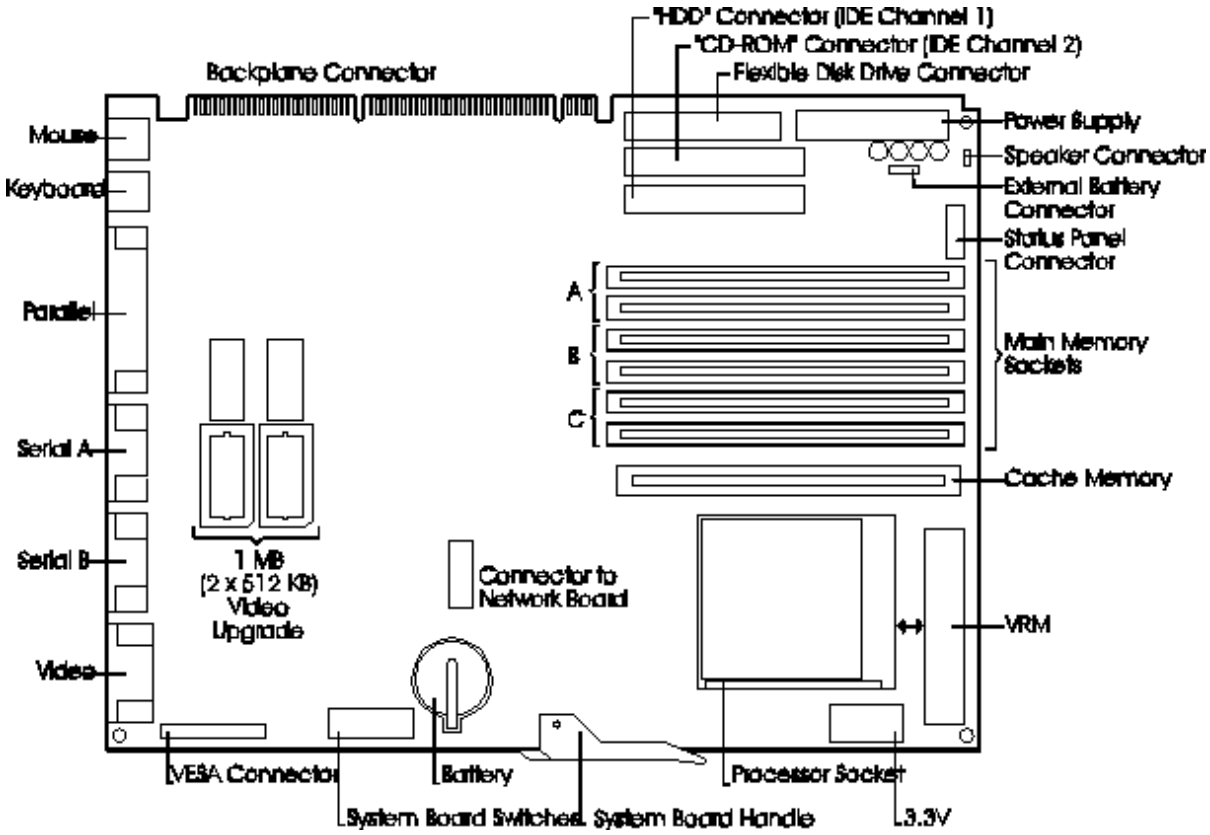
1 Slide the front panel tabs inwards, and remove the cover.

2 Unplug all internal connectors from the system board (Network, HDD, CD-ROM, Flexible Disk Drive, Power Supply, Speaker, External Battery, Status Panel).

3 Remove the left “side panel”.

4 Pull on the system board handle until the system board is levered free from the backplane.

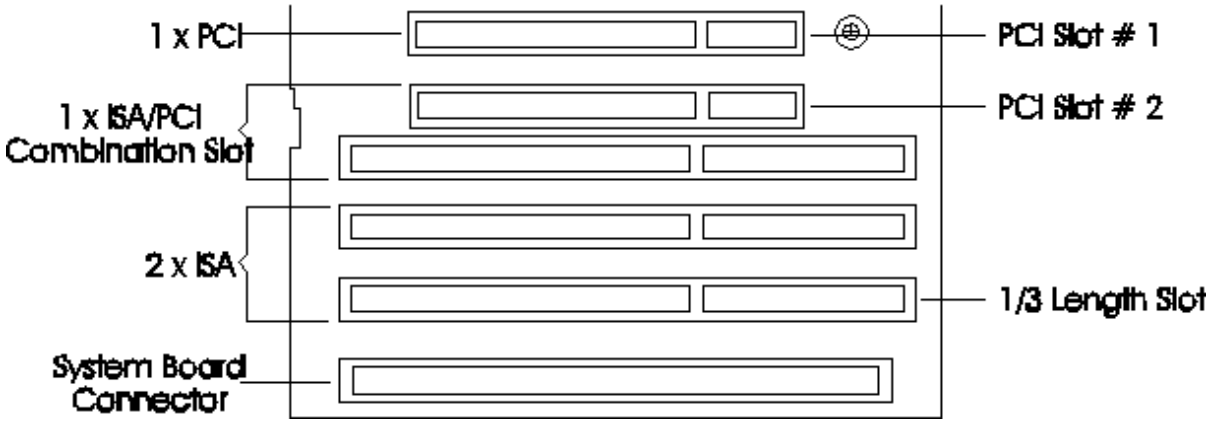
5 Lift out the system board.



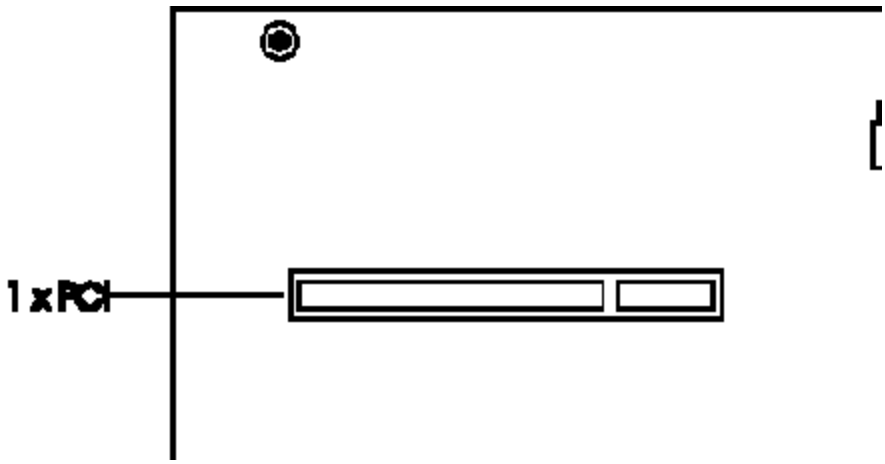
The ROM on the new system board will have a blank serial number field. This will be detected automatically by the BIOS, which will then prompt the user to enter the serial number which is printed on the identification label on the back of the PC.

THE BACKPLANE

The *HP Vectra XM 5/xx series 4 PC* has a new double-sided backplane. The left-hand side, as viewed from the front of the PC, is the same as that for the *HP Vectra VL 5/xx series 4 PC*.



The right-hand side, as viewed from the front of the PC, has the new PCI slot that accommodates the Enhanced Ethernet 10 BaseT Network board.



INSTALLING OR REPLACING ACCESSORIES

REPLACING THE PROCESSOR

The 75, 100, 133 and 150 MHz Pentium processors need a passive shorting block VRM (5063-7939), providing VCC voltage. The 120 and 166 MHz Pentium processors need an active VRM (5063-7940), providing VRE voltage. The appropriate VRM is provided with each processor upgrade kit.

The settings of system board switches 1, 2, 3, 4 and 7, as listed in the following table, must correspond with the operating frequency of the processor that is installed. (You will **not** need to change these switches if the new processor is an Intel Overdrive for the old Intel Pentium processor.) The location of the system board switches is shown in the diagram under "Replacing the System Board" in this chapter.

Switch			Switch			Frequency Ratio	
1	2	Local Bus Frequency	3	4	7	Processor : Local Bus	Processor Frequency
Closed	Closed	50 MHz	Open	Open	Open	1.5 : 1	75 MHz
Closed	Open	60 MHz	Open	Open	Closed	1.5 : 1	90 MHz*
Open	Closed	66 MHz	Open	Open	Closed	1.5 : 1	100 MHz
Closed	Open	60 MHz	Closed	Open	Closed	2 : 1	120 MHz
Open	Closed	66 MHz	Closed	Open	Closed	2 : 1	133 MHz
Closed	Open	60 MHz	Closed	Closed	Closed	2.5 : 1	150 MHz
Open	Closed	66 MHz	Closed	Closed	Closed	2.5 : 1	166 MHz

*The 90 MHz model is not available for the HP Vectra XM 5/xx series 4 PCs at the time of printing. This information is provided for completeness only.

INSTALLING OR REPLACING MAIN MEMORY MODULES

When additional memory modules are installed, the following rules must be applied:

1 Memory modules *must be installed in pairs*.

2 The two modules sharing a bank *must be identical*.

3 Different banks can contain memory module pairs of different sizes.

4 Install only 4 or 16 MB memory modules in bank C.

UPGRADING TO 2 MB OF VIDEO MEMORY

The upgrade kit comprises two modules of 512 KB. These two modules are identical and must be installed together, in the position shown under "Replacing the System Board" in this chapter. When inserting the modules, carefully align the corner dot on the module with the corner marker on the socket. If a module is incorrectly inserted, you will need the PLLC Extraction Tool (part number 5041-2553) to remove the module from the socket.

INSTALLING OR REPLACING MASS-STORAGE DRIVES

The integrated IDE hard disk controller has two channels (primary, HDD-recommended, with two grey connectors, and secondary, CD-ROM-recommended, with one red connector).

INSTALLING THE D3979A COAX ADAPTER

The Ethernet 10 BaseT network board is installed underneath the internal, hard disk drive, rear-shelf. It is plugged into the PCI accessory slot that is situated on the right-hand side of the double-sided backplane board.

To use a BNC coax connection, instead of the RJ-45 connection, a coax adapter (D3979A) is required. Its installation is described in the *HP Vectra Accessory Service Handbook* (5963-8034).

CHECKPOINT: PC HARDWARE STRUCTURE

Now that you have read this chapter, check your understanding. Draw a circle around the initial letter of each correct answer below. Any number of the given answers (from none, to all of them) may be correct.

1 Which of the following choices of upgrade steps is available from HP when upgrading main memory?

a 2 MB or 4 MB or 8 MB.
b 2 MB or 4 MB or 8 MB or 16 MB.
c 4 MB or 8 MB or 16 MB.
d 4 MB or 8 MB or 16 MB or 32 MB.
e 8 MB or 16 MB or 32 MB.
f 8 MB or 16 MB or 32 MB or 64 MB.
g 16 MB or 32 MB or 64 MB.
h 16 MB or 32 MB or 64 MB or 128 MB.

2 What is the HP upgrade for extending video memory?

	2X6 KB chips	X12 KB chips	1 MB chips	2 MB chips
a	1 X			
b	2 X			
c	4 X			
d		1 X		
e		2 X		
f		4 X		
g			1 X	
h			2 X	
i			4 X	
j				1 X
k				2 X
l				4 X

3 Where do you install extra video memory?

a next to the main memory modules
b next to the I/O panel
c next to the IDE connectors
d on a board in an accessory slot.

4 You are installing a hard disk drive (HDD) and a CD-ROM drive. Which data cable connections do you use?

a HDD to a red connector, CD-ROM to a red connector
b HDD to a red connector, CD-ROM to a grey connector
c HDD to a grey connector, CD-ROM to a red connector
d HDD to a grey connector, CD-ROM to a grey connector
e HDD to a SCSI connector, CD-ROM to a grey connector.

14 What type of network connection is fitted as standard on the back panel?

a RJ-45 UTP for 10 BaseT on all models
b RJ-45 UTP for 100 VG on all models
c BNC coax on all models
d it depends on the model

3 TROUBLESHOOTING AND REPAIR

After reading this chapter you will know which sub-assemblies can be replaced, and understand the new features of the POST and *Setup*.

SYSTEM ROM AND SECURITY SUPPORT

The System ROM consists of a 256 KB flash programmable EEPROM. This contains the *HP Vectra XM 5/xx series 4 PC* BIOS program, containing the POST and *Setup* programs. These are described in the next section of this chapter.

In addition, the System ROM provides support for the following securityfeatures, to protect against unauthorized access to the computer and its data:

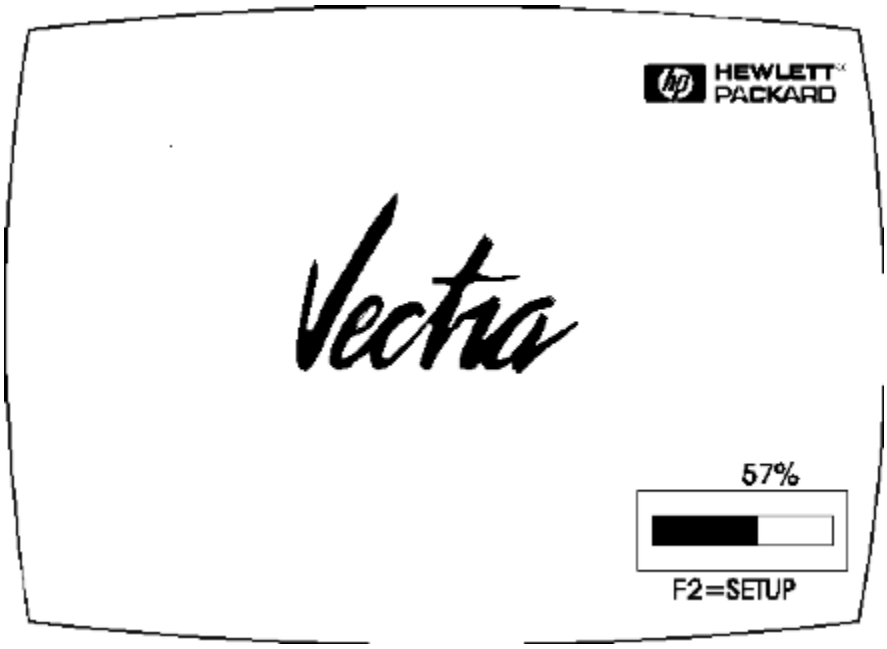
- power-on prompt, with User or System Administrator password
- power-on keyboard lock, with User or System Administrator password
- communications port protection (ports can be disabled in SETUP)
- disabling or enabling the network interface, the flexible disk drive, the IDE interface, the hard disk drive boot sector
- write protection of flexible disk drives
- disabling or enabling re-booting from the network interface, the flexible disk drive, the CD-ROM drive, the hard disk drive
- system configuration protection, with administrator password
- disabling or enabling space bar power-on
- cover lock
- on the desktop models, a security bracket.

After turning on the PC, the POST informs the user if there have been any unsuccessful attempts at running the PC. It gives the date and time at which the last successful attempt was made, and the number of unsuccessful attempts.

If, on the other hand, the user has forgotten the User and System Administrator passwords, they can be cleared by using the system board switches (SW-5 to clear the User and System Administrator passwords, as indicated under "System Board and Switches" later in this chapter).

HP BIOS

The system BIOS is identified by the version number GW.07.xx. It incorporates a new field to represent the “CPU date code”. If the POST routines run without finding any error, the user is only presented with the following screen.



If, on the other hand, the POST detects an error, the error message is displayed and the *Setup* program can be run to check the configuration. POST reports its diagnosis inside a *view system errors* screen, in which the *error message utility* (EMU) not only displays the error code, but the error diagnosis *and* the suggestions for corrective action. Details of these can be found in the *Technical Reference Manual* for the *HP Vectra XM 5/xx series 4 PC*.

Summary configuration screen

You can press [F2] while the above screen is being displayed to run the *Setup* program (as described in the following sub-sections). Alternatively, you can press [ESC] to view the summary configuration screen, an example of which is depicted on the next page.

XM/100 series 4 Copyright 1995 Hewlett-Packard — QA.xx.xx			
Any line of text can be entered here as a 'tatoo' for the PC			
BIOS version	GW.07.xx	PC Serial Number	FR54011111
CPU Date Code	N/A	LAN MAC address	0B.00.0C.13.44.45
System RAM	: 16 MB	COM1	: 3F8H (Serial A)
Bank A	: None	COM2	: 2F8H (Serial B)
Bank B	: 8 MB (EDO)	COM3	: None
Bank C	: 8 MB (FPM)	COM4	: None
Video RAM	: 1 MB	LPT1	: 378H
System Cache	: None	LPT2	: None
Video Device	: S3	LPT3	: None
1st IDE Device	: HDD 848 MB	Flexible Disk A	: 1.44 MB
2nd IDE Device	: None	Flexible Disk B	: None
3rd IDE Device	: None	Display type	: Not Available
4th IDE Device	: None		
ISA PnP	: Not Installed	PCI Slot #1	: Not Installed
ISA PnP	: Not Installed	PCI Slot #2	: Not Installed
ISA PnP	: Not Installed		
<F1> to continue, <F2> to run Setup, <F10> to power off, <F5> to retain			

Setup Program

You can interrupt the POST to run the *Setup* program by pressing [F2] once the **F2=Setup** message appears on the initial "Vectra" screen.

The *Setup* program has been completely redesigned. The band along the top of the screen offers **five menus: Main, Configuration, Security, Power, and Exit**. To select one of these, simply move to the appropriate name, using the left and right arrow keys.

Main Menu

The Main Menu presents the user with a list of fields, such as "System Time" and "Key auto-repeat speed". These can be selected using the up and down arrow keys, and can have their values changed using the [F7] and [F8] keys. The Power Menu, which is depicted later in this chapter, has a similar structure.

The "Item-Specific Help" field changes automatically as the user moves the cursor between the fields. It tells the user what the presently highlighted field is for, and what the options are.

Some fields are for displaying unchangeable information only. Examples include fields that only ever contain read-only information, and fields whose contents become "frozen" by the setting of a value in some other field, possibly on another menu. **Such read-only fields are displayed in a different color, and are shown without the "[" and "]" brackets**. When the user moves the cursor with the up and down arrow keys, such fields are skipped.

Other fields disappear completely when a choice in another field makes their appearance inappropriate (for example, the “Key auto-repeat speed” and “Delay before auto-repeat” fields disappear when the user selects Yes in the “Running Windows” field, since these parameters can then be set within the operating system).

Configuration Menu

The Configuration Menu does not have the same structure as the Main Menu and Power Menu. Instead of presenting a list of fields, it offers the user a list of sub-menus. Again, the user steps between the options using the up and down arrow keys, but presses the [ENTER] key to enter the chosen sub-menu (and the [ESC] key to go back again when finished).

Phoenix BIOS Setup Copyright 1985-95 Phoenix Technologies Ltd. Copyright 1995 Hewlett-Packard Rev. GW.07.xx								
	Configuration							
Integrated I/O Ports							**Item-Specific Help**	
Parallel port	[378h IRQ7]							
Parallel port mode	[Centronix™]						Enables or disables the on-board parallel port at the specific address. ‘Disabled’ frees resources used by the port.	
Serial port A	* 3F8h IRQ4							
Serial port B	[Disabled]							
[*] = The device is disabled for security reasons. To enable it, use the Security/Hardware Protection menu								
F1	**Help**	↕	**Select Item**	**F7/F8**	**Change Values**		**F9**	**Setup Defaults**
ESC	**Exit**	↔	**Select Menu**	**Enter**	**Select >Sub-Menu**		**F10**	**Previous Values**

If access to devices has been disabled in the Security Menu, then theconfiguration of those devices on the Configuration Menu becomes frozen, as shown above for Serial port A. The field becomes starred, appears in a different color and cannot be changed.

Disabling a device in the Configuration Menu (as has been done for Serial port B) **has the advantage of freeing the resources** (such as IRQs and peripheral addresses). **Disabling a device in the Security Menu disables the access, not the device**. It does not have the advantage of freeing the resources, but on the other hand, it does have the advantage of providing a useful means of temporarily disabling the device without losing the configuration settings.

Security Menu

This section is completely new with the *HP Vectra XM 5/xx series 4 PC*.Sub-menus are presented for changing the characteristics and values of the User Password, the System Administrator Password, the amount of protection against use of the system’s drives and network connections (using the Hardware Protection sub-menu), and the amount of protection against being able to boot from the system’s drives and network connections (using the Start-Up Centre sub-menu).

The next diagram depicts the System Administrator Password sub-menu. The minimum lengths of either type of password can be set to a specific number of characters, or to none. **The maximum length of each is 32 characters. A limit can be set for the maximum number of retries that are permitted** if the password is mistyped, and **whether a delay**

should be imposed (of a steadily increasing length) **before successive retries are accepted** (using the **exponential** setting for the “Lock Time Between Attempts” field).

Administrator Password is	Disabled	This password prevents unauthorized access to the computer’s configuration. This password can also be used to start the computer, The administrator password can be up to 32 characters and capitalization is not important (‘T’ is the same as ‘t’).
Set Administrator Password	[Press Enter]	
Power-On Password	[At Start-up]	
Minimum Admin Password Length	[None]	
Minimum User Password Length	[None]	
Maximum Number of Attempts	[3]	
Lock Time Between Attempts	[Exponential]	

Under the Start-Up Center sub-menu, the *Setup* program not only allows the user to select which devices are enabled or disabled for booting up the system, but also indicates their order of precedence when more than one is enabled:

The start-up priority follows the order of the devices listed below.		
Boot on Network	[Disabled]	
Boot on Flexible Disk	[Enabled]	
Boot on CD-ROM	[Enabled]	
Boot on Hard Disk	[Enabled]	

Power Menu

The “Power” menu allows the user to set the standby delay. It also allows the system administrator to decide whether the network, serial ports, mouse, or space bar are enabled as a means of reactivating the system from *standby* or *sleep*. **New** with the *HP Vectra XM 5/xx series 4 PC*, **it is possible to specify whether the network is enabled as a means of reactivating the system from *power-off***.

Phoenix BIOS Setup Copyright 1985-95 Phoenix Technologies Ltd. Copyright 1995 Hewlett-Packard Rev. GW.07.xx				
Main	**Configuration**	**Security**	**Power**	**Exit**
				Item-Specific Help
Standby delay		[30 min]		Enables or disables remote power-on. This feature works only with the integrated network interface.
Standby Wakeup		[Enabled]		
Mouse PS/2 IRQ12		[Enabled]		
Suspend Wakeup				
IRQ3 (Serial port)		[Enabled]		
IRQ4 (Serial port)		[Enabled]		
Integrated Network		[Enabled]		
Power-On				
Network		[Enabled]		
Space-bar		[Enabled]		
[*] = The device is disabled for security reasons. To enable it, use the Security/Hardware Protection menu				
F1 Help ↕ **Select Item**		**F7/F8 Change Values**		**F9 Setup Defaults**
ESC Exit ↔ **Select Menu**		**Enter Select >Sub-Menu**		**F10 Previous Values**

BIOS Update

The System ROM can be updated with the latest BIOS firmware. This can be ordered from HP or downloaded from one of HP's online services. (For more information on HP's online services, refer to the Hewlett-Packard Support and Information Services chapter in the User's Guide that was supplied with the computer.)

The System ROM is updated by running the PHLASH utility (**PHLASH.EXE**) which is supplied with BIOS upgrade. You must specify the *model number* of the PC since the PHLASH utility which supplied for a different model cannot be used with this one.

The procedure for running the Phlash program is the same as that for the *HP Vectra VL 5/xx series 4 PC*, except that it is necessary to type the command "PHLASH GWxxxx.FUL", where GWxxxx is the name of the new update BIOS code file. (Do not switch off the computer until the system BIOS update procedure has completed, successfully or not, since irrecoverable damage to the ROM can be caused).

System Board Switches

The system board switches can be found in the position indicated on page 16. Five of the switches are used for setting the frequencies of the processor buses, and are described in the section in Chapter 2 on replacing the processor. The functions of the remaining switches can be summarized as follows:

Switch		Function	Default
1-4	-	Processor frequency, see table under "Installing or Replacing Accessories"	-
5	**Open**	Enables User and Administrator passwords	**Open**
	Closed	Clears User and Administrator passwords	
6	**Open**	CMOS memory acts as non-volatile store for the *Setup* data	**Open**
	Closed	Clears the *Setup* configuration data in the CMOS memory	
7	-	Processor frequency, see the table on page 18	-
8	**Open**	Disables secure mode	**Open**
	Closed	Enables secure mode - prevents modification of the *Setup* data and flashing of the BIOS	
9	**Open**	Disables keyboard power-on	**Open**
	Closed	Enables keyboard power-on	
10	**Open**	Not used	**Open**

CHECKPOINT: TROUBLESHOOTING AND REPAIR

Now that you have read this chapter, check your understanding. Draw a circle around the initial letter of each correct answer below. Any number of the given answers (from none, to all of them) may be correct.

1 Which of the following switches can be changed on the system board?

a Security mode on/off, error detection on/off, flash enable/disable
b Error detection on/off, flash enable/disable, CMOS retain/clear
c Flash enable/disable, CMOS retain/clear, password enable/clear
d CMOS retain/clear, password enable/clear, security mode on/off

2 If a POST detects an error, how can you find out what it is?

a Press [ESC]
b Press [ENTER]
c Press [F1]
d Look the error code up in the *Technical Reference Manual*.
e A diagnosis is displayed on the screen without further user intervention.

3 What does it mean if the cursor skips over a field in the *Setup* program?

a That the field is for information only, and cannot be changed.
b That the field has been over-ridden by the settings on another menu.
c That the System ROM has become corrupted.

4 If “Boot” permission is enabled on all devices, and the flexible disk and CD-ROM drives are both loaded, where does the PC attempt to boot from first?

a hard disk drive
b CD-ROM drive
c flexible disk drive
d network.

5 Which of the following is able to start the PC from *power off*?

a network.
b serial port.
c keyboard.
d mouse.

A CHECKPOINT ANSWERS

This appendix contains the answers for the questions which are located at the ends of each chapter in this *HP Vectra XM 5/xx series 4 PC* Familiarization Guide.

CHECKPOINT ANSWERS

Chapter 1: Product Overview and Features

1 What new Intel processors are introduced with this series of PCs?

a Pentium processors of higher frequencies.
150 MHz and 166 MHz processors are introduced in the 5/150 and 5/166 models. There is no L2 cache memory on the processor chip, and the L1 cache memory is of a fixed size. The Pentium Pro is not pin-compatible with the Pentium.

2 Which of the following could normally be ordered for an *HP Vectra XM 5/120 series 4 PC* which is supplied with 16 MB of main memory?

a One D3647B kit (32-bit EDO, 60 ns).
Ordering three D3647B kits would not be advisable, since there are only three banks, of which one is already occupied. Ordering two D3647B kits would not be advisable either, since the last one cannot be used effectively in the C memory bank.

3 What type of network interface is fitted as standard?

c Enhanced Ethernet 10 BaseT on a PCI board.
Although it is a board that is installed on the PCI bus, it must be fitted in the slot on the double-sided back-plane that is dedicated exclusively for its use.

4 Which of the following combinations of full length accessory boards can you install on an *HP Vectra XM 5/100 series 4 PC*?

a One PCI accessory board and three ISA accessory boards **and**
c Two PCI accessory boards and one ISA accessory board.
There are two free PCI sockets, so (d) is impossible. (b) is also impossible, since occupying the combination slot with the second PCI board would leave space only for one full length ISA accessory board, and one third length ISA accessory board.

5 Which of the following combinations of *extra* drives can you install on a model which has no hard disk (such as a D4221A)?

a One CD-ROM drive, and one 3.5-inch 800 MB tape drive **and**
c One CD-ROM drive, and one 3.5-inch 1.0 GB hard disk drive **and**
d One CD-ROM drive, and two 3.5-inch 1.0 GB hard disk drives.
The CD-ROM drive needs to be installed in the middle front accessible shelf, as does the 1.36 GB tape drive. The first hard disk drive can be installed in the rear internal shelf. The 800 MB tape drive, and the second hard disk drive can each be installed in the bottom front-accessible shelf.

Chapter 2: PC Hardware Structure

1 Which of the following sets of choices of upgrade steps is available when upgrading main memory?

e 8 MB or 16 MB or 32 MB.
These are respectively composed of: kits containing pairs of 4 MB, 8 MB and 16 MB EDO parts, and a pair of kits containing a 32 MB FPM part.

2 What is the HP upgrade for extending video memory?

e 2 5 512 KB chips.
Thus extending the video memory from 1 MB to 2 MB.

3 Where do you install extra video memory?

b Next to the I/O panel.

4 You are installing a hard disk drive (HDD) and a CD-ROM drive. Which data cable connections do you use?

c HDD to a grey connector, CD-ROM to a red connector.
Connecting a CD-ROM drive to a grey connector would work, but might impede the performance of any hard disk drives that are connected on the same cable. There is no SCSI controller.

5 What type of network connection is fitted as standard on the back panel?

a RJ-45 UTP for 10 BaseT on all models.
The BNC coax connector is available as an accessory, as is the RJ-45 UTP for 100 VG.

Chapter 3: Troubleshooting and Repair

1 Which of the following can be changed on the system board switches?

d CMOS retain/clear, password enable/clear, security mode on/off.
The security mode on/off switch combines the functions of a CMOS retain/clear switch and a flash enable/disable switch. However, the *HP Vectra XM 5/xx series 4 PC* also has a separate CMOS retain/clear switch. The *HP Vectra XM 5/xx series 4 PC* does not provide support for error detection in its main memory modules.

2 If a POST detects an error, how can you find out what it is?

b Press [ENTER] **and**
e A diagnosis is displayed on the screen without further user intervention.
The answer in (e) is correct, inasmuch that a short message is printed. The answer in (b) is correct, inasmuch that a more detailed diagnosis can be obtained this way.

3 What does it mean if the cursor skips over a field in the *Setup* program?

a That the field is for information only, and cannot be changed **and**
b That the field has been over-ridden by the settings on another menu.
In particular, (b) could be appropriate if a device is being viewed on the Configuration Menu, but has been disabled on the Security Menu; and (a) is appropriate for read-only information about the system.

4 If “Boot” permission is enabled on all devices, and the flexible disk and CD-ROM drives are both loaded, where does the PC attempt to boot from first?

d network.
The devices in the question are tried in the order: d, c, b, a.

5 Which of the following is able to start the PC from *power off*?

a network **and**
c keyboard.
Response (a) is the important one which sets the *HP Vectra XM 5/120 series 4 PC* apart from other members of the HP Vectra PC family.

B FINAL TEST

This appendix contains the Final Quiz for this *HP Vectra XM 5/xx series 4 PC* Familiarization Guide.

Working through the Final Quiz will help you consolidate and strengthen your knowledge of the *HP Vectra XM 5/xx series 4 PC*.

FINAL TEST

Now that you have read this familiarization guide, complete the following questionnaire to check your understanding. Draw a circle around the letter that corresponds to the *one* completely correct answer.

1 Which of the following video controllers is supplied with the *HP Vectra XM 5/xx series 4 PC*?
- a Integrated Ultra VGA controller
- b Ultra VGA accessory board in ISA slot
- c Ultra VGA accessory board in PCI slot
- d Both a and c.

2 How much video memory is supplied as standard?
- a b56 KB
- b 512 KB
- c a MB
- d b MB

3 What is the maximum capacity of video memory that can be fitted?
- a a MB
- b b MB
- c d MB

4 What is the maximum capacity of main memory that can be fitted?
- a 64 MB
- b 96 MB
- c a28 MB
- d a92 MB

5 Which memory modules can be installed in bank C?
- a d and 16 MB modules
- b 8 and 32 MB modules
- c 4, 8, 16 and 32 MB modules

6 You are installing an IDE hard disk drive and an IDE CD-ROM. Assuming that the PC has no previously installed drives, which data cable connections do you use?
- a Hard disk drive on inside HDD connector,
  CD-ROM on outside (end) HDD connector.
- b Hard disk drive on outside (end) HDD connector,
  CD-ROM on inside HDD connector.
- c Hard disk drive on inside HDD connector,
  CD-ROM on a red CD-ROM connector.
- d Hard disk drive on outside (end) HDD connector,
  CD-ROM on a red CD-ROM connector.

7 From which of the following modes can the arrival of network packets cause the *HP Vectra XM 5/120 series 4 PC* to become re-activated?

a The PC is in *standby* mode.
b The PC is in *sleep* mode.
c The PC is turned off, but the power cord remains connected.
d The PC is turned off, and the power cord is disconnected.
e Answers (a) and (b).
f Answers (a), (b) and (c).
g Answers (a), (b), (c) and (d).

8 How would you disable “Numlock on Power-On”?

a On the Main Menu
b On the Configuration Menu
c On the Security Menu
d On the Power Menu.

9 Which of the following combinations of rear connectors is fitted as standard?

	Serial ports	Parallel ports	IDE connectors
a	0	1	0
b	1	1	0
c	2	1	0
d	0	1	1
e	1	1	1
f	2	1	1

10 Which of the following combinations of rear connectors is fitted as standard for networks?

	10 MB/s LAN RJ-45 connectors	100 MB/s LAN RJ-45 connectors	BNC LAN Coax connectors
a	0	0	0
b	0	0	1
c	0	1	0
d	0	1	1
e	1	0	0
f	1	0	1
g	1	1	0
h	1	1	1

Student Name: _____

Company Name: _____

Company Address: _____

_____

_____

D ANSWERS TO THE FINAL TEST

This appendix contains the answers to the Final Test for this *HP Vectra VL 5/xx series 4 PC* Familiarization Guide.

ANSWERS TO THE FINAL TEST

1 Which of the following video controllers is supplied in the *HP Vectra XM 5/xxx series 4 PC* models?

a Integrated Ultra VGA controller.

2 How much video memory is supplied as standard?

c 1 MB

3 What is the maximum capacity of video memory that can be fitted?

b 2 MB

4 What is the maximum capacity of main memory that can be fitted?

c 128 MB

5 Which memory modules can be installed in bank C?

a 4 and 16 MB modules

6 You are installing a hard disk drive and a CD-ROM. Assuming that the PC has no previously installed drives, which data cable connections do you use?

c Hard disk drive on inside HDD connector, CD-ROM on a red CD-ROM connector.

7 From which of the following modes can the arrival of network packets cause the *HP Vectra XM 5/120 series 4 PC* to become re-activated?

f Answers (a), (b) and (c).

8 How would you disable “Numlock on Power-On”?

a On the Main Menu.

9 Which of the following combinations of rear connectors is fitted as standard?

c 2 serial ports, 1 parallel port, 0 IDE connectors.

10 Which of the following combinations of rear connectors is fitted as standard for networks?

e One 10 Mb/s LAN RJ-45 connector, no 100 Mb/s LAN RJ-45 connectors, no BNC LAN Coax connectors.